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20050014977 [View on USPTO site](#) **8-Apr-2004**

Process for the carbonylation of epoxides

Background	Detailed Description	Claims
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Pub. No / Pub. Date: 20050014977 / 20-Jan-2005

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Legal-Intellectual Property
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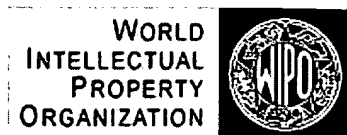
Serial No. / Filed Date: 10820958 / 8-Apr-2004

U.S. class: **568/451**; 540/145

International class: **C07D 487/22**; C07C 27/02

Abstract: The present invention pertains to a process for the carbonylation of an epoxide by reacting it with carbon monoxide in the presence of a catalyst system containing two components, wherein the first component is a source of one or more metals selected from the group consisting of cobalt, ruthenium and rhodium, and the second component is a coordination complex of a tetrapyrrole compound with one or more of the metals belonging to the group consisting of groups IIIA and IIIB of the periodic system, lanthanides and actinides. The present invention also pertains a process for the preparation of a catalyst system.





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|----------|---|-----------------------|---|
| 1. (100) | <u>(WO 1994/011416) PREPARATION OF COPOLYMERS OF CARBON MONOXIDE AND OLEFINICALLY UNSATURATED COMPOUNDS</u> | 26.05.1994 C08G 67/02 | SHELL
INTERNATIONALE
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A process for the preparation of copolymers of carbon monoxide and olefinically unsaturated compounds in the presence of an aprotic solvent and a catalyst system based on (a) a Group VIII metal, (b) an acid or an anion thereof having a pK_a of less than 2, and (c) a phosphorus bidentate ligand of the general formula R₁R₂P-R-P-R₁R₂, wherein R₁ and R₂ represent identical or different aliphatic alkyl groups and R is a divalent organic bridging group containing at least two carbon atoms in the bridge connecting the two phosphorus atoms, characterized in that the copolymerization is carried out in the additional presence of hydrogen, while the molar ratio of catalyst component (c) to catalyst component (a) is in the range of from 1 to 10.

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| 2. (100) | <u>(WO 1994/018154) CARBONYLATION PROCESS</u> | 18.08.1994 B01J 31/24 | SHELL
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The invention provides a process for the carbonylation of ethylenically unsaturated compounds by reaction with carbon monoxide and a co-reactant in the presence of a substantially non-acidic catalyst system based on a palladium compound and a bidentate ligand of the formula (I): R₁R₂M₁RM₂R₃R₄ wherein M₁ and M₂ independently represent a phosphorus, arsenic or antimony atom, R represents a bivalent organic bridging group, R₁, R₂, R₃ and R₄ independently represent substituted or non-substituted aliphatic groups, with the proviso that R₁ together with R₂, and/or R₃ together with R₄ represent a bivalent cyclic group with at least 5 ring atoms whereby the two free valencies are linked to M₁ or M₂, respectively. In addition, the invention provides...

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| 3. (100) | <u>(WO 1994/021585) PROCESS FOR THE CARBONYLATION OF ACETYLENICALLY UNSATURATED COMPOUNDS</u> | 29.09.1994 C07C 51/14 | SHELL
INTERNATIONALE
RESEARCH
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A process for the carbonylation of acetylenically unsaturated compounds in the presence of a nucleophilic compound having one or more removable hydrogen atoms and a catalyst system based on (a) a source of platinum, (b) a bisphosphine of the general formula (I): R₁R₂PR₃R₄ wherein each of R₁, R₂, R₃ and R₄ independently represents a hydrocarbyl group, which may be unsubstituted or substituted with one or more substituents selected from the group consisting of halogen atoms, cyano, alkoxy, acyl, alkylamino and dialkylamino groups, and R represents a bivalent bridging groups containing 2 to 5 atoms in the bridge, and (c) a source of anions being the conjugated base of an acid having a pK_a of less than 4.

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| 4. (100) | <u>(WO 1995/003269) PROCESS FOR THE CARBONYLATION OF ACETYLENICALLY UNSATURATED COMPOUNDS</u> | 02.02.1995 C07C 67/38 | SHELL
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A process for the carbonylation of acetylenically unsaturated compounds with carbon monoxide in the presence of a nucleophilic compound having one or more mobile hydrogen atoms as co-reactant, and of a catalyst system based on (a) a source of palladium cations; (b) a bidentate diphosphine of the general formula: R₁R₂P-R-PR₃R₄ wherein each of R₁,

R2, R3 and R4 independently represents a substituted or non-substituted aliphatic or cycloaliphatic group, or R1 together with R2, and/or R3 together with R4 represent a substituted or non-substituted bivalent cyclic group with at least 5 ring atoms whereby the two free valencies of such a cyclic group are linked to a single phosphorus atom, and R represents a bivalent organic bridging group contain...

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| 5. (100) <u>(WO 1995/005354) HYDROFORMYLATION PROCESS</u> | 23.02.1995 C07C 29/16 | SHELL
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Process for the hydroformylation of ethylenically unsaturated compounds, by reaction with carbon monoxide and hydrogen in the presence of a catalyst based on a metal of the platinum group, a source of anions other than halide anions and a bidentate ligand of the formula R1R2M1RM2R3R4 wherein M1 and M2 are phosphorus, arsenic or antimony, R is a bivalent organic bridging group with 1 to 4 atoms in the bridge, R1 and R2 together represent a bivalent cyclic group and R3 and R4 independently represent an optionally substituted hydrocarbyl group or together represent a bivalent substituted or non-substituted cyclic group whereby the two free valencies are linked to M2.

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| 6. (100) <u>(WO 1995/005357) PROCESS FOR THE CARBONYLATION OF ACETYLENICALLY UNSATURATED COMPOUNDS</u> | 23.02.1995 C07C 67/38 | SHELL
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The invention relates to a process for the carbonylation of acetylenically unsaturated compounds, whereby a feedstock comprising an acetylenically unsaturated compound and a relatively minor amount of an 1,2-alkadiene compound is contacted under carbonylation conditions with carbon monoxide and a hydroxylated co-reactant, in the presence of a catalyst system, based on: a) a source of cations of one or more metals of Group VIII of the Periodic Table; b) a phosphine of the general formula PR1R2R3 or R2R3M-R-PR1R2, wherein R1 represents a heteroaryl group of formula (I) wherein A represents a functional group that is electron-withdrawing relative to hydrogen, and each of X, Y and Z independently represents a nitrogen atom or a C-Q group, where...

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| 7. (100) <u>(WO 1995/014001) PROCESS FOR THE PREPARATION OF ETHYLENICALLY UNSATURATED COMPOUNDS</u> | 26.05.1995 C07C 67/04 | SHELL
INTERNATIONALE
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A process for the preparation of ethylenically unsaturated compounds by contacting an acetylenically unsaturated compound or a 1,2-alkadiene with a Bronsted acid in the presence of a catalyst based on zero-valent ruthenium and a trivalent phosphorus containing compound.

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| 8. (100) <u>(WO 1995/029946) CATALYST SYSTEM AND PROCESS FOR THE PREPARATION OF COPOLYMERS OF CARBON MONOXIDE AND OLEFINICALLY UNSATURATED COMPOUNDS</u> | 09.11.1995 C08G 67/02 | SHELL
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A catalyst system suitable for the copolymerization of carbon monoxide with an ethylenically unsaturated compound which catalyst system is based on (a) a source of palladium cations, and (b) a bidentate ligand of the general formula R1R2P-CH2-CH2-PR3R4 wherein R1 represents a phenyl group substituted with a polar group at one or both ortho-positions and/or the para-position with respect to the phosphorus atom to which the said phenyl group is linked, and R2, R3 and R4 independently represent a substituted or non-substituted hydrocarbyl group; and a process for the preparation of copolymers of carbon monoxide and an ethylenically unsaturated compound by reacting the monomers in the presence of said catalyst system.

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| 9. (100) <u>(WO 1995/032998) PREPARATION OF COPOLYMERS OF CARBON MONOXIDE AND AN ALIPHATIC ALPHA-OLEFIN</u> | 07.12.1995 C08G 67/02 | SHELL
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A catalyst composition suitable for the copolymerisation of carbon monoxide with an aliphatic 'alpha'-olefin, which catalyst composition comprises: a) a palladium compound, and b) an asymmetric phosphorus bidentate ligand of the general formula R5R6P-Q-CHR9-PR7R8, wherein Q is a 1,2-ferrocenyl bridging group, R5, R6, R7 and R8 are identical or different optionally polar substituted hydrocarbyl groups and R9 is hydrogen or an optionally polar substituted hydrocarbyl group; a process for the preparation of linear alternating copolymers of carbon monoxide with an aliphatic 'alpha'-olefin having at least 3 carbon atoms, which process comprises contacting a mixture of the monomers with said catalyst composition; isotactic linear alternating copolymer...

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| 10. (100) | <u>(WO 1997/000127) CATALYST COMPOSITION AND PROCESS FOR THE PREPARATION OF COPOLYMERS OF CARBON MONOXIDE AND AN OLEFINICALLY UNSATURATED COMPOUND</u> | 03.01.1997 C08G 67/02 | SHELL
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A catalyst composition which is based upon (a) a source of nickel cations, and (b) a bidentate ligand of the general formula (I): R1R2M1-R-M2R3R4 wherein M1 and M2 represent independently phosphorus, nitrogen, arsenic or antimony, R1, R2, R3 and R4 represent independently optionally substituted hydrocarbyl groups on the understanding that at least one of R1, R2, R3 and R4 represent a substituted aryl group, and R represents a bivalent bridging group of which the bridge consists of at most two bridging atoms, and a process for the preparation of copolymers of carbon monoxide and an olefinically unsaturated compound comprising contacting the monomers in the presence of the said catalyst composition.

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| 11. (100) | <u>(WO 1997/003943) PROCESS FOR THE CONTINUOUS CARBONYLATION OF OLEFINS</u> | 06.02.1997 C07C 67/38 | SHELL
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RESEARCH
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B.V. SHELL
CANADA LIMITED |
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The invention relates to a process for the continuous carbonylation of olefins whereby an olefin is reacted with carbon monoxide and a nucleophilic compound in the presence of a catalyst system based on: (a) a source of a Group VIII metal cations, (b) a source of an aliphatic diphosphine, and (c) a carboxylic acid which is the hydrocarboxylation product of the olefin, whereby during the process the carboxylic acid is either added continuously or intermittently or is prepared in-situ by continuous or intermittent addition of water.

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| 12. (100) | <u>(WO 1997/020803) PROCESS FOR THE CARBONYLATION OF ACETYLENICALLY UNSATURATED COMPOUNDS</u> | 12.06.1997 C07C 45/50 | SHELL
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A process for the carbonylation of acetylenically unsaturated compounds by reaction with carbon monoxide and a co-reactant in the presence of a catalyst system based on: (a) a source of platinum; (b) a bidentate ligand of the formula R1R2M1-R-M2R3R4, wherein M1 and M2 independently are P, As or Sb, R represents a bivalent substituted or non-substituted bridging group containing from 1 to 5 atoms in the bridge, R1 and R2 together are a substituted or non-substituted bivalent group whereby the two free valencies are linked to M1, and R3 and R4 together are a substituted or non-substituted bivalent group whereby the two free valencies are linked to M2 or R3 and R4 independently are substituted or non-substituted hydrocarbyl groups; and (c) a s...

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| 13. (100) | <u>(WO 1997/027160) PROCESS FOR THE PREPARATION OF PROPYNE</u> | 31.07.1997 C07C 5/23 | SHELL
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The invention relates to a process for the preparation of propyne by contacting a propadiene-containing feed with an isomerization catalyst comprising a strong base dissolved in an amide solvent.

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| 14. (100) | <u>(WO 1997/035832) PROCESS FOR THE CARBONYLATION OF ACETYLENICALLY UNSATURATED COMPOUNDS</u> | 02.10.1997 C07C 67/38 | SHELL
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The invention relates to a process for the carbonylation of acetylenically unsaturated compounds, whereby a feedstock comprising an acetylenically unsaturated compound and a relatively minor amount of a 1,2-alkadiene compound is contacted under carbonylation conditions with carbon monoxide and a co-reactant, in the presence of a catalyst system, based on: a) a source of cations of one or more metals of Group VIII of the Periodic Table; b) a phosphine having an aromatic substituent which contains an imino nitrogen atom separated by at least one bridging carbon atom from the phosphorus atom; and c) a protic acid, characterized in that the catalyst system is further based on d) a monodentate monophosphine or monophosphite.

15. (100) (WO 1997/038964) PROCESS FOR THE CARBONYLATION OF ETHYLENICALLY UNSATURATED COMPOUNDS 23.10.1997 C07C 67/38 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

The invention provides a process for the carbonylation of ethylenically unsaturated compounds by reaction thereof with carbon monoxide and a coreactant in the presence of a catalyst system obtainable by combining (a) a source of a Group VIII metal cation, (b) a phosphine, arsine or stibine compound acting as a ligand; and (c) a source of anions, other than halide anions, carried out in the presence of substoichiometric amounts of halide anions and/or - in case of a coreactant other than an aromatic alcohol - in the presence of a phenolic promoter. It also provides novel alkylphenol esters that find use as synthetic lubricant.

16. (100) (WO 1998/042440) CATALYST PREPARATION 01.10.1998 B01J 31/18 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A catalyst suitable for the polymerization of ethylenically unsaturated compounds. A bidentate ligand with general formula (I) in which X = P, As, Sb, n = 0 or 1, R₁?, R₂? = alkyl, alkoxy, aryloxy, cycloalkyl or a substituted or non-substituted (cyclo)aliphatic, (cyclo)olefinic or aromatic group with 1-24 C-atoms, or R₁? and R₂? may form together a substituted or non-substituted cycloaliphatic, cyclo-olefinic or aromatic group, R₃?, R₄?, R₅?, R₆? = H, alkyl, alkoxy, aryloxy, cycloalkyl or a substituted or non-substituted (cyclo)aliphatic, (cyclo)olefinic or aromatic group with 1-24 C-atoms, and if n = 1: R₅? and/or R₆? = H, alkyl, alkoxy, aryloxy, cycloalkyl or a substituted or non-substituted (cyclo)aliphatic, (cyclo)ole...

17. (100) (WO 1998/042717) DIPHOSPHINES 01.10.1998 B01J 31/24 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

The invention relates to a diphosphine of the following formula: R¹₂P-R²₂-PR³₂R⁴₂ wherein R²₂ represents a covalent bridging group, R¹₂ represents a bivalent radical that together with the phosphorus atom to which it is attached is an optionally substituted 2-phospha-tricyclo[3.3.1.1{3,7}]decyl group or a derivative thereof in which one or more of the carbon atoms are replaced by heteroatoms ('2-PA' group), and wherein R³₂ and R⁴₂ independently represent univalent radicals of up to 20 atoms or jointly form a bivalent radical of up to 20 atoms; to carbonylation catalysts obtainable by combining: (i) a metal cation selected from the groups (8, 9 or 10) of the Periodic Table of Elements, and (ii) the new diphosphine; and further...

18. (100) (WO 1999/005085) HYDROGENOLYSIS OF GLYCEROL 04.02.1999 C07C 29/60 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the catalytic hydrogenolysis of glycerol in the presence of a homogeneous catalyst that is based on a platinum group metal or a compound of a platinum group metal, an anion source, and a metal-complexing compound of the formula Q¹₂Q²₂MQ³₂ (I) or Q¹₂Q²₂MQMQ³₂Q⁴₂ (II) wherein M represents phosphorus, arsenic or antimony, Q represents a group that is covalently bonded to both M's and having at least two atoms in the bridge and Q¹₂ to Q⁴₂ are independently similar or dissimilar optionally substituted hydrocarbyl groups or Q¹₂ and Q²₂ and/or Q³₂ and Q⁴₂ represent similar or dissimilar optionally substituted hydrocarbylene groups.

19. (100) (WO 2000/006615) A POLYMERIZATION PROCESS 10.02.2000 C08F 210/02 BASELL TECHNOLOGY COMPANY B.V.

The invention relates to a process for the polymerization of ethene and optionally one or more other olefin monomers by contacting the monomers under polymerization conditions with a catalyst system obtainable by combining: (a) a palladium, nickel or platinum ion, (b) an anion derived from an acid having a pKa of less than 3, and containing an atom of Group V A of the Periodic Table of Elements, wherein the Group V A atom is substituted with at least one aryl group, said aryl groups being substituted with a polar group on the ortho position. The invention also relates to a novel class of cyclic olefin copolymers, containing functional groups, which are obtainable with the above process.

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20. (100) (WO 2000/009583) CATALYST COMPOSITION AND PROCESS FOR THE PREPARATION OF COPOLYMERS OF CARBON MONOXIDE AND AN OLEFINICALLY UNSATURATED COMPOUND 24.02.2000 B01J 31/18 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A catalyst composition which is based upon (a) a source of nickel cations and (b) a bidentate ligand of the general formula (I): $R^?1\text{ }R^?2\text{ }M^?1\text{ }R\text{ }M^?2\text{ }R^?3\text{ }R^?4$ wherein $M^?1$ and $M^?2$ represent independently phosphorus, nitrogen, arsenic or antimony, $R^?1$, $R^?2$, $R^?3$ and $R^?4$ independently represent optionally substituted aliphatic or alicyclic groups and R represents a bivalent bridging group of which the bridge which extends directly between the atoms $M^?1$ and $M^?2$ consists of at most two bridge atoms; and a process for the preparation of copolymers of carbon monoxide and an olefinically unsaturated compound comprising contacting the monomers in the presence of the said catalyst composition.

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21. (100) (WO 2000/009521) CATALYST COMPOSITIONS AND PROCESS FOR THE PREPARATION OF POLYKETONES 24.02.2000 B01J 31/18 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Catalyst compositions based on a source of a Group VIII metal and a ligand, together capable of forming a complex of formula (I) wherein Z represents a Group VIII metal selected from palladium, cobalt and nickel and $(R^?1\text{ }R^?2\text{ })M^?1\text{ }R\text{ }M^?2\text{ }R^?3\text{ }R^?4$ represents the ligand, in which $M^?1$ and $M^?2$, independently, represent a phosphorus, nitrogen, arsenic or antimony atom; $R^?1$, $R^?2$, $R^?3$ and $R^?4$, independently, represent either identical or different, optionally polar substituted hydrocarbyl groups; and R represents a divalent organic bridging group in which the bridge connecting $M^?1$ and $M^?2$ consists of four atoms, and which bridging group contains a single cyclic structure sharing an unsaturated carbon-carbon bond with said br...

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22. (100) (WO 2000/009584) CATALYST COMPOSITION AND PROCESS FOR THE PREPARATION OF COPOLYMERS OF CARBON MONOXIDE AND AN OLEFINICALLY UNSATURATED COMPOUND 24.02.2000 B01J 31/18 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A catalyst composition which is based upon: (a) a source of nickel cations and (b) a bidentate ligand of the general formula $R^?1\text{ }R^?2\text{ }M^?1\text{ }R\text{ }M^?2\text{ }R^?3\text{ }R^?4$ (I), wherein $M^?1$ and $M^?2$ represent independently phosphorus, nitrogen, arsenic or antimony, $R^?1$, $R^?2$, $R^?3$ and $R^?4$ represent independently optionally substituted hydrocarbyl groups on the understanding that at least one of $R^?1$, $R^?2$, $R^?3$ and $R^?4$ represents a substituted aryl group, and R represents a bivalent bridging group of which the bridge which extends directly between the atoms $M^?1$ and $M^?2$ consists of three bridge atoms of which the middle atom is substituted; and a process for the preparation of copolymers of carbon monoxide and an olefinically unsaturated...

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23. (100) (WO 2000/056695) PROCESS FOR THE CARBONYLATION OF CONJUGATED DIENES 28.09.2000 C07C 67/38 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

The present invention relates to a process for the carbonylation of conjugated dienes, whereby a conjugated diene is reacted with carbon monoxide and a hydroxyl group containing compound in the presence of a catalyst system including: (a) a source of palladium cations, (b) a phosphorus-containing ligand, (c) a source of anions, wherein the phosphorus-containing ligand is a ligand having the general formula (I): $X^?1\text{ }R\text{ }X^?2$ wherein $X^?1$ and $X^?2$ represent a substituted or non-substituted cyclic group with at least 5 ring atoms, of which one is a phosphorus atom, and R represents a bivalent organic bridging group, connecting both phosphorus atoms, containing from 1 to 4 atoms in the bridge, whereby the carbonylation process can be performed...

24. (100) (WO 2001/028972) PROCESS FOR THE CARBONYLATION OF AN ACETYLENICALLY UNSATURATED COMPOUND 26.04.2001 C07C 67/38 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Process for the carbonylation of an acetylenically unsaturated compound by reaction with carbon monoxide and a co-reactant in the presence of a catalyst system based on (a) a source of platinum; (b) a source of anions and (c) a diphosphine of the following formula (1) $R^1-P(R^2)_2-PR^3R^4$ wherein R^2 represents a covalent bridging group, R^1 represents a bivalent radical that together with the phosphorus atom to which it is attached is an optionally substituted 2-phospha-tricyclo[3.3.1.1^{3,7}]decyl group or a derivative thereof in which one or more of the carbon atoms are replaced by heteroatoms ('2-PA' group), and wherein R^3 and R^4 independently represent univalent radicals of up to 20 atoms or jointly form a bivalent ra...

25. (100) (WO 2001/049644) PROCESS FOR THE CARBONYLATION OF FORMALDEHYDE 12.07.2001 C07C 29/149 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A carbonylation process, wherein formaldehyde or a derivative thereof is reacted with carbon monoxide in the presence of a catalyst composition including: a) an acidic compound with pKa value below -1, b) a sulfone.

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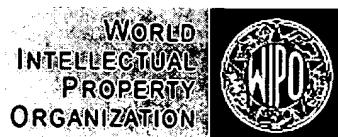
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26. (100)	<u>(WO 2001/072697) PROCESS FOR THE CARBONYLATION OF PENTENENITRILE</u>	04.10.2001	B01J 31/18	SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Process to prepare a 5-cyanovaleric acid or its ester by carbonylation of a pentenenitrile, wherein pentenenitrile is reacted with carbon monoxide and water or an alcohol in the presence of a catalyst system. The catalyst system comprises: (a) a metal of Group VIII or a compound thereof and (b) a bidentate phosphine, arsine and/or stibine ligand, wherein the bidentate ligand has the general formula (I): $R^?1\text{ }R^?2\text{ }-M^?1\text{ }-R-M^?2\text{ }-R^?3\text{ }R^?4$ wherein $M^?1$ and $M^?2$ are independently P, As or Sb, R is a divalent organic bridging group, which bridging group. (c) an acid having a pKa less than 3, as measured at 18 °C in an aqueous solution.

27. (100)	<u>(WO 2001/068583) PROCESS FOR THE CARBONYLATION OF ETHYLENICALLY UNSATURATED COMPOUNDS</u>	20.09.2001	B01J 31/18	SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
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Process for the carbonylation of ethylenically unsaturated compounds having 3 or more carbon atoms by reaction with carbon monoxide and an hydroxyl group containing compound in the presence of a catalyst system. The catalyst system includes (a) a source of palladium cations; (b) a bidentate diphosphine of formula (I): $R^?1\text{ }R^?2\text{ } > P - R^?3\text{ } - R - R^?4\text{ } - P < R^?5\text{ }R^?6$, wherein P represents a phosphorus atom; $R^?1$, $R^?2$, $R^?5$ and $R^?6$ independently represent the same or different optionally substituted organic groups containing a tertiary carbon atom through which the group is linked to the phosphorus atom; $R^?3$ and $R^?4$ independently represent optionally substituted alkylene groups and R represents an optionally substituted aromatic g...

28. (100)	<u>(WO 2001/087899) BIDENTATE LIGANDS USEFUL IN CATALYST SYSTEM</u>	22.11.2001	C07C 45/50	SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
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Bidentate ligand of formula (II) $R^?1\text{ }R^?2\text{ }M^?1\text{ }-R-M^?2\text{ }R^?3\text{ }R^?4$, wherein $M^?1$ and $M^?2$ are independently P, As or Sb; $R^?1$, $R^?2$, $R^?3$ and $R^?4$ independently represent tertiary alkyl groups, or $R^?1$ and $R^?2$ together and/or $R^?3$ and $R^?4$ together represent an optionally substituted bivalent cycloaliphatic group whereby the two free valencies are linked to $M^?1$ or $M^?2$, and R represents a bivalent aliphatic bridging group containing from 2 to 6 atoms in the bridge, which is substituted with two or more substituents. A catalyst system comprising: a) a source of group VIII metal cations, b) a source of such a bidentate ligand, and c) a source of anions. Use of such a catalyst system in a process for the carbonylation of optional...

29. (100)	<u>(WO 2002/064250) PROCESS FOR THE CARBONYLATION OF ETHYLENICALLY UNSATURATED COMPOUNDS, BIDENTATE DIPHOSPHINE COMPOSITION USED IN THIS PROCESS AND PROCESSES FOR PREPARATION OF THIS BIDENTATE DIPHOSPHINE COMPOSITION</u>	22.08.2002	B01J 23/42	SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
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Process for the carbonylation of optionally substituted ethylenically unsaturated compounds by reaction with carbon monoxide and a coreactant in the presence of a catalyst system. The catalyst system includes (a) a source of Pt group metal cations, (b) a bidentate diphosphine composition. More than 60% w/w of bidentate diphosphine present in the bidentate diphosphine composition has the general formula (II) $X^?1\text{ }-R-X^?2$ wherein $X^?1$ and $X^?2$ independently

represent an optionally substituted symmetrical phosphabicycloalkyl group, having at least 5 ring atoms; and R represents a bivalent organic bridging group, connecting both phosphorus atoms. Bidentate diphosphine composition wherein more than 60% w/w of bidentate diphosphine present has...

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30. (100) (WO 2002/083747) PROCESS FOR THE PREPARATION OF A POLYMER-AMINE 24.10.2002 B01J 31/18 SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V.

Process for the preparation of a polymer-amine comprising: a) reacting an ethylenically unsaturated polymer with carbon monoxide and hydrogen in the presence of a hydroformylation catalyst, yielding a polymer-aldehyde; b) reacting the polymer-aldehyde of step a) in a carbon monoxide depleted environment with a nitrogen-containing compound and hydrogen in the presence of an amination catalyst yielding a polymer-amine; wherein step b) is carried out in the presence of the hydroformylation catalyst used in step a). Atactic polymer-amine, having in the range from 10 to 40 'mm' triads; in the range from 20 to 80 'mr' or 'rm' triads; and in the range from 10 to 40 'rr' triads. Fuel composition or lubricating oil composition comprising such an atactic...

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31. (100) (WO 2003/040159) BIDENTATE LIGANDS FOR THE CARBONYLATION OF UNSATURATED COMPOUNDS 15.05.2003 B01J 23/44 SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V.

Bidentate ligand of formula (I), R₁R₂M₁-R-M₂R₃R₄ wherein M₁ and M₂ each independently represent P, As or Sb; R₁, R₂, R₃ and R₄ each independently represent the same or a different optionally substituted organic group and at least one of R₁, R₂, R₃ and R₄ contains a tertiary carbon atom through which the group is linked to M₁ or M₂; and R represents a bridging group based on a trimethylene group connecting M₁ and M₂ of which the middle carbon atom is double bonded to a non-metal element chosen from group 14, 15 or 16 of the periodic table of elements. Catalyst comprising this bidentate ligand and carbonylation process in which this catalyst is used.

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32. (100) (WO 2003/040065) BIDENTATE LIGAND FOR THE TELOMERIZATION OF DIENES 15.05.2003 B01J 23/44 SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V.

Process for the telomerization of a conjugated diene, wherein the conjugated diene is reacted with a compound containing an active hydrogen atom and having a formula R-H in the presence of a telomerization catalyst based on: (a) a source of group VIII metal, (b) a bidentate ligand wherein the bidentate ligand has the general Formula (I): R₁R₂M₁-R-M₂R₃R₄ wherein M₁ and M₂ are independently P, As or Sb; R₁, R₂, R₃ and R₄ independently represent a monovalent aliphatic group; or R₁, R₂ and M₁ together and/or R₃, R₄ and M₂ together independently represent an optionally substituted aliphatic cyclic group with at least 5 ring atoms, of which one is the M₁ or M₂ atom, respectively; R represents a bivalent organic bridging group; and novel bidentate...

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33. (100) (WO 2003/070370) PROCESS FOR THE CARBONYLATION OF AN ETHYLENICALLY UNSATURATED COMPOUND AND CATALYST THEREFOR 28.08.2003 B01J 31/24 SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V.

Process for the carbonylation of an ethylenically unsaturated compound with carbon monoxide and a coreactant. The carbonylation reaction is carried out in the presence of a novel catalyst comprising: a) a source of a group VIII metal; b) a bidentate diphosphine of formula (I), wherein R¹₂ represents a bivalent radical that together with the phosphorus atom to which it is attached is an optionally substituted 2-phospha-tricyclo[3.3.1.1^{3,7}]-decyl group or a derivative thereof in which one or more of the carbon atoms are replaced by heteroatoms ('2-PA' group); wherein R²₂ and R³₂ independently represent univalent radicals of up to 20 atoms or jointly ...

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34. (100) (WO 2003/070679) PROCESSES FOR THE PREPARATION OF A CARBOXYLIC ANHYDRIDE AND USE OF THE CARBOXYLIC ANHYDRIDE AS AN ACYLATION AGENT 28.08.2003 C07C 51/56 SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V.

Process for the preparation of an carboxylic anhydride by reaction of an ethylenically unsaturated compound with carbon monoxide and an carboxylic acid in the presence of a catalyst comprising: a) a source of a group VIII metal, b) a bidentate diphosphine of formula (I), wherein R1 represents a bivalent radical that together with the phosphorus atom to which it is attached is an optionally substituted 2-phospha-tricyclo [3.3.1.1{3,7}]-decyl group or a derivative thereof in which one or more of the carbon atoms are replaced by heteroatoms ('2-PA' group); wherein R2 and R3 independently represent univalent radicals of up to 20 atoms or jointly form a bivalent radical of up to 20 atoms; wherein...

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| 35. (100) <u>(WO 2004/029014) PROCESS FOR THE PRODUCTION OF PRIMARY ALCOHOLS</u> | 08.04.2004 B01J 31/02 | SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V. |
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A process for producing primary alcohols from secondary alcohols and/or tertiary alcohols and/or ketones, wherein the process comprises reacting a compound selected from a secondary alcohol, a tertiary alcohol, a ketone, or mixtures thereof, with carbon monoxide and hydrogen in the presence of a catalyst based on: i) a source of Group VIII metal, ii) a bidentate ligand having the general formula (I): R1-R2M1-R-M2R3R4 wherein M1 and M2 are independently P, As or Sb; R1 and R2 together represent a bivalent substituted or unsubstituted cyclic group whereby the two free valencies are linked to M1; R3 and R4 independently represent a substituted or unsubstituted hydrocarbyl group, or together represent a bivalent or non-substituted cyclic group w...

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| 36. (100) <u>(WO 2004/028689) PROCESS FOR THE HYDROFORMYLATION OF AN ETHYLENICALLY UNSATURATED COMPOUND USING A BIDENTATE DIPHOSPHINE COMPOSITION WITH A BRIDGING GROUP COMPRISING SP2 HYBRIDIZED CARBON ATOMS BOUND TO THE PHOSPHOROUS ATOMS</u> | 08.04.2004 B01J 31/24 | SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V. |
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Process for the hydroformylation of an optionally substituted ethylenically unsaturated compound by reaction thereof with carbon monoxide and hydrogen in the presence of a specific catalyst system. The specific catalyst system comprises: a) a source of group VIII metal cations; b) a diphosphine ligand having the general formula X1-R-X2, wherein X1 and X2 each independently represent an optionally substituted cyclic group with at least 5 ring atoms, of which one is a phosphorus atom, and R represents a bivalent optionally substituted bridging group, connected to each phosphorus atom by a sp2 hybridized carbon atom; c) an acid having a pKa < 3, measured in an aqueous solution at 18 °C or a salt derived thereof; and d) a source of halide a...

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| 37. (100) <u>(WO 2004/054946) HYDROFORMYLATION PROCESS FOR THE CONVERSION OF AN ETHYLENICALLY UNSATURATED COMPOUND TO AN ALCOHOL</u> | 01.07.2004 B01J 23/75 | SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V. |
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The invention pertains to a hydroformylation process for the conversion of an ethylenically unsaturated compound to an alcohol comprising a first step of reacting at an elevated temperature in a reactor the ethylenically unsaturated compound, carbon monoxide, hydrogen, and a phosphine-containing cobalt hydroformylation catalyst, which are dissolved in a solvent, followed by a second step of separating a mixture comprising the alcohol and heavy ends from a solution comprising the catalyst and the solvent, followed by a third step of recycling the solution to the reactor.

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| 38. (100) <u>(WO 2004/054947) PROCESS FOR THE HYDROFORMYLATION OF ETHYLENICALLY UNSATURATED COMPOUNDS IN THE PRESENCE OF AN ACID AND A MONO TERT-PHOSPHINE</u> | 01.07.2004 C07C 29/16 | SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ
B.V. |
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The invention pertains to a process for the hydroformylation of an ethylenically unsaturated compound in the presence of an acid with a pKa < +3, and a catalyst of a group VIII metal and a bidentate ligand of the formula: R1R2-P-X-P-R3R4 (I) wherein P is a phosphorus atom, X represents a bivalent organic bridging group, R1, R2, R3 and R4 represent independently a substituted or unsubstituted hydrocarbyl group, or R1 and R2 together with the phosphorus atom to which they are bonded and/or R3 and R4 together with the phosphorus atom to which they are bonded represent a bivalent substituted or unsubstituted cyclic group, characterized in that the process is performed in the presence of a mono tert-phosphine, wherein the ratio moles of mono ter...

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| 39. (100) <u>(WO 2004/089923) CARBONYLATION OF EPOXIDES</u> | 21.10.2004 C07D 305/12 | SHELL
INTERNATIONALE
RESEARCH
MAATSCHAPPIJ |
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B.V.

The present invention pertains to a process for the carbonylation of an epoxide by reacting it with carbon monoxide in the presence of a catalyst system containing two components, wherein the first component is a source of one or more metals selected from the group consisting of cobalt, ruthenium and rhodium, and the second component is a coordination complex of a tetrapyrrole compound with one or more of the metals belonging to the group consisting of groups IIIA and IIIB of the periodic system, lanthanides and actinides. The present invention also pertains a process for the preparation of catalyst system, and to the use of such catalyst system for the carbonylation of epoxides.

40. (100) (WO 2004/103948) PROCESS FOR THE CARBONYLATION OF A CONJUGATED DIENE 02.12.2004 C07C 67/38 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the carbonylation of a conjugated diene, comprising reacting the conjugated diene with carbon monoxide and a co-reactant having a mobile hydrogen atom in the presence of a catalyst system including: (a) a source of palladium; and (b) a bidentate diphosphine ligand of formula (II): $R_1R_2 > p_1R_3m-R_4n-p_2 < R_5R_6$ wherein p_1 and p_2 represent phosphorus atoms; R_1 , R_2 , R_5 , and R_6 independently represent the same or different optionally substituted organic radical containing a tertiary carbon atom through which each radical is linked to the phosphorus atom; R_3 and R_4 independently represent the same or different optionally substituted methylene groups; R represents an organic group comprising the bivalent bridging group C1-C2 through ...

41. (100) (WO 2004/103942) PROCESS FOR THE HYDROCARBOXYLATION OF ETHYLENICALLY UNSATURATED CARBOXYLIC ACIDS 02.12.2004 C07C 51/14 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the hydrocarboxylation of an ethylenically unsaturated carboxylic acid, by reacting it with carbon monoxide and a co-reactant selected from the group of water and carboxylic acids in the presence of a catalyst system including: (a) a source of palladium; (b) a bidentate diphosphine of formula (I), $R_1R_2 > P - R_3 - R - R_4 - P < R_5R_6$ (I) wherein P represents a phosphorus atom; R_1 , R_2 , R_5 and R_6 independently represent the same or different optionally substituted organic groups containing a tertiary carbon atom through which the group is linked to the phosphorus atom; R_3 and R_4 independently represent optionally substituted alkylene groups and R represents an optionally substituted aromatic group; (c) a source of anions derived fr...

42. (100) (WO 2005/039758) CATALYTIC TRIMERIZATION OF OLEFINIC MONOMERS 06.05.2005 C07C 2/36 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A catalyst composition suitable for the trimerization of olefinic monomers, wherein the catalyst composition comprises: a) a source of chromium, molybdenum or tungsten; b) a ligand of general formula (I); $(R_1)(R_2)P-X-P(R_3)(R_4)$ wherein: X is a bivalent organic bridging group; R_1 and R_3 are independently selected from, hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl and substituted heterohydrocarbyl groups, with the proviso that when R_1 and R_3 are cycloaromatic groups they do not contain a polar substituent at any of the ortho-positions; R_2 and R_4 are independently selected from optionally substituted cycloaromatic groups, each R_2 and R_4 bearing a polar substituent on at least one of the ortho-positions; and c) a cocatalyst. The pr...

43. (100) (WO 2005/058788) PROCESS OF PREPARING GLYCOLALDEHYDE 30.06.2005 B01J 31/24 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

The invention provides a process of preparing glycolaldehyde by reacting formaldehyde with hydrogen and carbon monoxide in the presence of a catalyst composition which is based on, a) a source of rhodium, and b) a ligand of general formula $R_1P-R_2(I)$, wherein R_1 is a bivalent radical that together with the phosphorous atom to which it is attached is an optionally substituted 2-phospha-tricyclo[3.3.1.1^{3,7}]-decyl group, wherein from 1 to 5 of the carbon atoms has been replaced by a heteroatom, and wherein R_2 is a monovalent radical which is an optionally substituted hydrocarbyl group having from 1 to 40 carbon atoms; a catalyst composition of use in said process; and a process of preparing ethylene glycol from the glycolaldehyde th...

44. (100) (WO 2005/082829) PROCESS FOR THE CARBONYLATION OF A CONJUGATED DIENE 09.09.2005 C07C 67/38 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the carbonylation of a conjugated diene, comprising reacting the conjugated diene with carbon monoxide and a co-reactant having an active hydrogen atom in the presence of a catalyst system including: (a) a source of palladium; and (b) a bidentate diphosphine ligand of formula (II): $R_1 - P_1 - R - P_2 - R_2R_3$ wherein P_1 and p_2 represent phosphorus atoms; R_1 represents an optionally substituted divalent organic group linked to the phosphorus atom by two tertiary carbon atoms; and R_2 and R_3 independently represent univalent groups of from 1 to 20 atoms containing a tertiary carbon atom through which each group is linked to the phosphorus atom, or R_2 and R_3 jointly form an optionally substituted divalent organic group containing at lea...

45. (100) (WO 2005/082830) PROCESS FOR THE CARBONYLATION OF ETHYLENICALLY OR ACETYLENICALLY UNSATURATED COMPOUNDS 09.09.2005 B01J 31/24 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the carbonylation of unsaturated compounds by contacting the unsaturated compound with carbon monoxide in the presence of a catalyst system comprising: (a) a source of palladium and/or platinum; and (e) an unsymmetrical bidentate diphosphine ligand of formula (I), $R_1R_2 - P_1 - R_3 - P_2 - R_4R_5$ (I) wherein P_1 and P_2 represent phosphorus atoms; R_3 represents a divalent organic bridging group; and R_1 , R_2 , R_4 and R_5 each individually, or R_1 and R_2 jointly, and/or R_4 and R_5 jointly represent organic groups that are covalently linked to the phosphorus; and wherein R_1 , R_2 , R_4 and R_5 are chosen in such way, that the phosphino group $R_1R_2 - P_1$ differs from the phosphino group $P_2 - R_4R_5$.

46. (100) (WO 2006/084889) PROCESS FOR THE PREPARATION OF A DICARBOXYLIC ACID 17.08.2006 C07C 51/44 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the preparation of a dicarboxylic acid, comprising the steps of (a) contacting a conjugated diene with carbon monoxide and water in the presence of a catalyst system including a source of palladium, a source of an anion and a bidentate phosphine ligand, to obtain a mixture containing an ethylenically unsaturated acid and one or more reversible adduct of the conjugated diene and the ethylenically unsaturated acid; and (b) removing unreacted conjugated diene, and the reversible adducts of the conjugated diene from the reaction mixture; and (c) reacting the mixture obtained in step (b) containing the ethylenically unsaturated acid further with carbon monoxide and water to obtain the dicarboxylic acid.

47. (100) (WO 2006/084890) PROCESS FOR THE PREPARATION OF A DICARBOXYLIC ACID 17.08.2006 C07C 51/14 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the preparation of a dicarboxylic acid, comprising the steps of (a) contacting a conjugated diene with carbon monoxide and water in the presence of a catalyst system including a source of palladium, a source of an anion and a bidentate phosphine ligand, to obtain a mixture comprising an ethylenically unsaturated acid product; (b) reacting the mixture obtained in step (a) further with carbon monoxide and water to obtain the dicarboxylic acid in admixture with the ethylenically unsaturated acid; (c) separating the dicarboxylic acid from a liquid filtrate comprising the catalyst system; and (d) recycling at least part of the obtained liquid filtrate to step (a).

48. (100) (WO 2006/084891) PROCESS FOR THE CARBONYLATION OF A CONJUGATED DIENE 17.08.2006 C07C 51/14 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the carbonylation of a conjugated diene to an ethylenically unsaturated acid, comprising the steps of (a) contacting a conjugated diene with carbon monoxide and water in the presence of a catalyst system including a source of palladium, a source of an anion and a bidentate phosphine ligand, to obtain a mixture comprising an ethylenically unsaturated acid and a reversible diene adduct comprising alkenyl ester of the conjugated diene with the ethylenically unsaturated acid; (b) separating the obtained reaction mixture into a gaseous stream comprising unreacted conjugated diene and carbon monoxide, a first liquid product stream comprising at least part of the ethylenically unsaturated acid and the reversible diene adducts, and a ...

49. (100) (WO 2006/084892) PROCESS FOR THE PREPARATION OF A DICARBOXYLIC ACID 17.08.2006 C07C 55/14 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the preparation of a saturated dicarboxylic acid, comprising the steps of (a) contacting a conjugated diene with carbon monoxide and water to obtain a mixture containing an ethylenically unsaturated acid product and one or more reversible adducts of the conjugated diene and the ethylenically unsaturated acid; and (b) reacting the ethylenically unsaturated acid product further with carbon monoxide and water to obtain the dicarboxylic acid, wherein step (a) and (b) are performed in the presence of a catalyst system including a source of palladium, a source of an anion and a bidentate phosphine ligand, and wherein in step (a) the water concentration is maintained at a range of from 0.001 to less than 3% by weight of water, calcul...

50. (100) (WO 2006/084893) PROCESS FOR THE CARBONYLATION OF A CONJUGATED DIENE TO A DICARBOXYLIC ACID 17.08.2006 C07C 51/14 SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

A process for the carbonylation of a conjugated diene to a dicarboxylic acid, comprising the steps of (a) contacting a conjugated diene with carbon monoxide and water in the presence of a catalyst system including a source of palladium, a source of an anion and a bidentate phosphine ligand, to obtain a mixture comprising an ethylenically unsaturated acid and reversible diene adducts; (b) separating the obtained reaction mixture into a gaseous stream comprising unreacted conjugated diene and carbon monoxide, a first normally liquid stream comprising at least part of the ethylenically unsaturated acid and the reversible diene adducts, and a second normally liquid stream comprising the catalyst system in admixture with the ethylenically unsatu...

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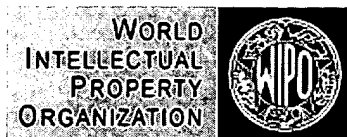
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|-----------|---|------------|-------------|--------------------------------------|
| 51. (100) | <u>(WO 1998/002124) MASSAGING APPARATUS HAVING TWO ROLLERS AND A SUCTION CHAMBER</u> | 22.01.1998 | A61H 9/00 | PHILIPS ELECTRONICS N.V. |
| | In a massaging apparatus (1) with two rotatable rollers (30, 31), which are spaced apart transversely to their roller spindles (32, 33), and with a suction chamber (56) disposed in the area of the two rollers (30, 31) and having two transverse walls (57, 58) extending transversely to the roller spindles (32, 33) and two longitudinal walls (59, 60) extending parallel to the roller spindles (32, 33), which suction chamber is connected to a pump (67) via an air-transfer connection (66) for generating a vacuum in the suction chamber (56) so as to form a skin fold (72) which is drawn into the suction chamber (56), at least one longitudinal wall (59, 60) is disposed between the two rollers (30, 31) and the free end (62, 63) of a longitudinal wall... | | | |
| 52. (100) | <u>(WO 2005/063093) LIQUID CARTRIDGE FOR USE IN A BEVERAGE SYSTEM</u> | 14.07.2005 | A47J 31/44 | KONINKLIJKE PHILIPS ELECTRONICS N.V. |
| | The invention relates to a device (1) for preparing a heated liquid for use with a beverage-making appliance (15), said device (1) comprising a liquid transport channel (25) in communication with a liquid reservoir (11) which discharges into a first chamber (26), said first chamber (26) comprising a steam inlet (16) which is connectable to a steam generator (32), and a second chamber (28) which is connected to the first chamber (26) via a restriction (27) and which has a liquid outlet (29), wherein the device for preparing a heated liquid comprises a cartridge (100) in which the liquid reservoir (11), the liquid transport channel (25), the first chamber (26), the steam inlet (16), the restriction (27), the second chamber (28), and the liqui... | | | |
| 53. (100) | <u>(WO 1998/002876) MAGNETO-OPTICAL RECORDING MEDIUM AND MAGNETO-OPTICAL RECORDER USING THE MEDIUM</u> | 22.01.1998 | G11B 11/105 | TOYOTA JIDOSHA KABUSHIKI KAISHA |
| | A Co thin film for magneto-optical recording is made of a material having a large polar rotation angle in an ultraviolet region to achieve high density recording. A Co thin film (14) is vacuum deposited on an Si substrate with a Cu seed layer (12) therebetween. The orientation of the Si substrate is (100) or (111). The thicknesses of the Cu seed layer (12) and the Co thin film (14) are both approximately 100 nm. The Co thin film (14) is a single crystal thin film having a face-centered cubic lattice structure with an orientation of (100) or (111). Such a Co thin film (14) has a polar rotation angle of maximum 0.4° in the ultraviolet wavelength region of 200-230 nm. | | | |
| 54. (100) | <u>(WO 1991/013996) A METHOD FOR OBTAINING AN ANAEROBIC THERMOPHILIC BACTERIUM, THUS OBTAINABLE BACTERIUM AND ITS USE FOR THE FERMENTATION OF CARBOHYDRATES</u> | 19.09.1991 | C12P 7/46 | RIJKSUNIVERSITEIT GRONINGEN |
| | The invention relates to a method for obtaining an anaerobic thermophilic bacterium comprising isolation of a carbohydrate fermenting bacterium capable of producing succinate at a temperature within a range of 40-80 °C using carbohydrate as a major source of carbon and energy. Bacteria obtainable according to said method and a method for the fermentation of carbohydrates with a succinate producing bacterium, at a temperature within the range of 40-80 °C and in a medium containing carbohydrates metabolisable by said bacterium is described. | | | |
| 55. (100) | <u>(WO 2002/026690) PROCESS FOR THE CARBONYLATION OF A CONJUGATED DIENE</u> | 04.04.2002 | B01J 31/24 | DSM N.V. |

Process for the carbonylation of a conjugated diene by reacting the conjugated diene with carbon monoxide and an hydroxyl group containing compound in the presence of a catalyst system based on: (a) a source of palladium cations, (b) a diphosphine ligand, and (c) a source of anions, wherein the diphosphine ligand is a ligand having the general formula I wherein x_1 and x_2 represent a cyclic group with at least 5 ring atoms, of which one is a phosphorus atom, and R represents a bivalent aliphatic bridging group, connecting both phosphorus atoms, containing from 2 to 4 atoms in the bridge, which is substituted with at least one substituent or R represents a phenyl group with both phosphorus groups bound to the 1, 2-position.

56. (100) (WO 2003/006416) PROCESS FOR THE CARBONYLATION OF A CONJUGATED DIENE AND USE OF SUCH PROCESS IN THE PREPARATION OF CAPROLACTAM OR ADIPIC ACID 23.01.2003 C07C 67/38 DSM IP ASSETS B.V.

Process for the carbonylation of a conjugated diene, comprising reacting the conjugated diene with carbon monoxide and an alkanol in the presence of a metal-based catalyst to form an ester, whereby further a polymeric by-product is formed, wherein the polymeric by-product is separated from the metal-based catalyst with help of a solvent. The process can be used in the preparation of caprolactam or adipic acid.

57. (100) (WO 2004/065123) WEB-FED ROTARY PRESS 05.08.2004 B41F 13/10 DRENT HOLDING B.V.

The invention relates to a web-fed rotary press comprising at least one printing group in which at least one exchangeable, inkable plate cylinder (1) and at least one exchangeable rubber blanket cylinder (2) are arranged respectively in movable bearings and fixed bearings in such a way that they can be removed from the movable bearings. The plate cylinder consists of a drivable core (3) and an exchangeable sleeve (6) which is placed over the core, and the rubber blanket cylinder (2) consists of a synchronously drivable core (3) and an exchangeable sleeve (27) which is placed over the associated core. At least one of the cylinder sleeves (6, 27) is connected to the cylinder core (3) thereof in a positively locking manner.

58. (100) (WO 2004/103707) PRINTING CYLINDER SUPPORT UNIT FOR USE IN AN OFFSET PRINTING PRESS 02.12.2004 B41F 13/44 DRENT HOLDING B.V.

Printing cylinder support unit (1) for use in an offset printing press, comprising a frame (8, 9) and three bearing devices. Each bearing device comprises a set of support means (5, 6, 7) which is intended to support a printing cylinder (2, 3, 4) such that it can rotate about its centre axis and can be exchanged if necessary. A first bearing device also comprises a first rotary arm (10) which is connected to the frame (8) in order to pivot between a first printing position and a first changeover position. The support means (5) of the first bearing device are provided on the first rotary arm (10). Furthermore, the printing cylinder support unit (1) is provided with first position-determining means (30, 31) which determine the first printing ...

59. (100) (WO 2005/030487) EXCHANGEABLE OFFSET PRINTING CYLINDER SLEEVE, USE OF AND ASSEMBLY COMPRISING AN OFFSET PRINTING CYLINDER SLEEVE OF THIS TYPE 07.04.2005 B41C 1/18 DRENT HOLDING B.V.

An exchangeable offset printing cylinder sleeve according to the invention comprises a sleeve-shaped core layer and a sleeve-shaped printing layer. At least part of the outer surface of the sleeve-shaped printing layer is defined as a printing surface which is suitable for carrying a removable image. The sleeve-shaped printing layer is a continuous sleeve at the location of the printing surface. In this context, continuous sleeve means that the printing layer is physically uninterrupted and that the properties of the printing layer which make it suitable for carrying an image layer do not vary significantly. The exchangeable offset printing cylinder sleeve is thus suitable for carrying a continuous printing image. The sleeve-shaped core layer...

60. (100) (WO 2006/054892) IMAGE TRANSFER SLEEVE AND OFFSET PRINTING PRESS PROVIDED WITH AN IMAGE TRANSFER SLEEVE OF THIS TYPE 26.05.2006 B41F 30/04 DRENT HOLDING B.V.

An image transfer sleeve (111) is designed to be removably fitted around a mandrel of an offset printing press and comprises a printing cylinder sleeve (110) and an image transfer blanket (100). The image transfer blanket (100) extends around the printing cylinder sleeve (110) and is connected to the printing cylinder sleeve (110) by means of adhesive force. Two opposite edges (102, 104) of the image transfer blanket (100) form a seam (113). The seam (113) is at least partially wavy. The image transfer blanket (100) is present along at least part of each describing line of the peripheral surface of the image transfer sleeve (111).

Search Summary



drent: 60 occurrences in 60 records.

Search Time: 0.04 seconds.



10/820958

CAS online

Page 1

=> s epoxide and carbonmonoxide and tetrapyrrole and cobalt

47696 EPOXIDE

93 CARBONMONOXIDE

1731 TETRAPYRROLE

375333 COBALT

L1 0 EPOXIDE AND CARBONMONOXIDE AND TETRAPYRROLE AND COBALT

=> s epoxide

L2 47696 EPOXIDE

=> s carbon monoxide

1219350 CARBON

177396 MONOXIDE

L3 150144 CARBON MONOXIDE

(CARBON(W) MONOXIDE)

=> s l1 and l2

L4 0 L1 AND L2

=> s l1 and cobalt

375333 COBALT

L5 0 L1 AND COBALT

=> s tetrapyrrole

L6 1731 TETRAPYRROLE

=> s l1 and l6

L7 0 L1 AND L6

=> s l2 and l3

L8 141 L2 AND L3

=> s l8 and cobalt

375333 COBALT

L9 38 L8 AND COBALT

=> s l9 and l6

L10 1 L9 AND L6

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L10 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2006 ACS on STN

AN 2004:878384 CAPLUS

DN 141:367623

TI Catalytic carbonylation of epoxides into lactones

IN Drent, Eit; Ernst, Rene

PA Shell Internationale Research Maatschappij B.V., Neth.

SO PCT Int. Appl., 16 pp.

CODEN: PIXXD2

DT Patent

LA English

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004089923	A1	20041021	WO 2004-EP50477	20040407
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI,			

NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
 TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
 RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
 BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE,
 ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
 SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN,
 TD, TG

EP 1615901 A1 20060118 EP 2004-726177 20040407
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
 IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR
 CN 1771238 A 20060510 CN 2004-80009540 20040407
 US 2005014977 A1 20050120 US 2004-820958 20040408
 PRAI EP 2003-252260 A 20030409
 WO 2004-EP50477 W 20040407

OS CASREACT 141:367623

AB A process for the carbonylation of an epoxide (e.g., ethylene oxide) in a lactone (e.g., β -propiolactone) is described by reacting the epoxide with carbon monoxide in the presence of a catalyst system containing two components, where the first component is a source of one or more metals selected from cobalt, ruthenium, and rhodium, and the second component is a coordination complex of a tetrapyrrole compound with one or more of the metals belonging to Groups IIIA and IIIB, lanthanides, and actinides.

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
 ALL CITATIONS AVAILABLE IN THE RE FORMAT

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L11 1 L8 AND L6

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L11 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2006 ACS on STN
 AN 2004:878384 CAPLUS
 DN 141:367623
 TI Catalytic carbonylation of epoxides into lactones
 IN Drent, Eit; Ernst, Rene
 PA Shell Internationale Research Maatschappij B.V., Neth.
 SO PCT Int. Appl., 16 pp.
 CODEN: PIXXD2
 DT Patent
 LA English
 FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2004089923	A1	20041021	WO 2004-EP50477	20040407
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RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1615901	A1	20060118	EP 2004-726177	20040407
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,				

	IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR
CN 1771238	A 20060510 CN 2004-80009540 20040407
US 2005014977	A1 20050120 US 2004-820958 20040408
PRAI EP 2003-252260	A 20030409
WO 2004-EP50477	W 20040407

OS CASREACT 141:367623

RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

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(FILE 'HOME' ENTERED AT 11:02:15 ON 18 SEP 2006)

FILE 'CAPLUS' ENTERED AT 11:02:29 ON 18 SEP 2006

L1	0 S EPOXIDE AND CARBONMONOXIDE AND TETRAPYRROLE AND COBALT
L2	47696 S EPOXIDE
L3	150144 S CARBON MONOXIDE
L4	0 S L1 AND L2
L5	0 S L1 AND COBALT
L6	1731 S TETRAPYRROLE
L7	0 S L1 AND L6
L8	141 S L2 AND L3
L9	38 S L8 AND COBALT
L10	1 S L9 AND L6
L11	1 S L8 AND L6

10/820 958 EAST

- ☒ Drafts
- ☒ Pending
- ☒ Active
 - ☒ L1: (31271) epoxide
 - ☒ L2: (1498343) carbon(w)monoxide
 - ☒ L3: (27435) 11 and 12
 - ☒ L4: (186) 13 and carbonylation
 - ☒ L5: (74) 14 and cobalt
 - ☒ L6: (1116564) 15 and tetra(w)pyrrole
 - ☒ L7: (0) 15 and tetrapyrrole
 - ☒ L8: (1147808) tetra(w)pyrrole
 - ☒ L9: (57) 15 and 18
 - ☒ L10: (1) ("5103027").PN.
 - ☒ L11: (0) 13 and 17
 - ☒ L12: (16879) 13 and 18
 - ☒ L13: (57) 15 and 18
 - ☒ L14: (140) 14 and 18